

Dec. 1879.

Mr. Common, Observations etc.

95

	G.M.T.			Pos.	Dist.	Value.	Remarks.
	h	m	s	°	"		
Nov. 15	10	40			95.45	2	
Nov. 18	8	9	5	105	7	108.49	2 Night very fine, with heavy dew.
	8	11	50	103	48	3	
	8	13	25	103	33	4	
	8	15			106.28	2	
	8	43	50	102	24	110.99	3
	8	47	15	103	33	109.9	3

Nov. 1879.

*Observations of the Satellites of Mars.* By A. A. Common, Esq.

The following observations of the satellites of *Mars* were made by me at Ealing, near London, with an Equatoreal Newtonian Reflector of 36 inches aperture. In all cases the full aperture was used with powers of 220, 240, or 380. The great disparity in light between the objects to be measured necessitated some modification of the ordinary micrometer which it would perhaps be better to describe.

Instead of using a bar in the field, behind which the planet could be placed by moving the whole micrometer, as was done by me at the last opposition, this was done:—The spider webs were taken out of an ordinary double parallel-wire micrometer and the springs taken away from one frame. This frame was then free to slip easily to and fro, and as far in as the nut was adjusted to. Attached to this frame, somewhere near where the wire would be, was a light arm, carrying at the end a small disk of steel just large enough to hide the planet, and so placed as to slide central over and along the position wires up to the intersection of these by the fixed wire supplied to replace the wire taken from the frame spoken of. These position wires were of silk fibre, two in number, and placed at a distance apart equal to about 12" of arc. The other frame carried a similar wire, and was movable in the ordinary way. The idea with this arrangement was to place the intersection of the fixed wire with the position wires central on the planet and then bring up the steel disk to hide it, adjust the position wires at an equal distance on each side of the satellite, then bring down the movable wire, and so get a measure of position and distance at one operation. But in practice it was found that the fixed wire interfered somewhat with the proper placing of the others on the planet, and it was not always done in this way.

Measuring positions in this way with double wires, where the objects are comparatively close (considering the width of the parallel wires), although suggested or recommended to be done by Professor Hall, in his account of the discovery of the satellites,

seems to me to be inferior to the use of one wire, or of three wires—the two outer ones being placed so as to cut off very small segments of the planet, the central one bisecting the satellite, and the measurements being made in pairs by rotating the position-circle through 180°, unless the middle wire could be placed exactly central—thus getting rid of the uncertainty that exists in properly placing the satellite with respect to the two wires.

Better results may be obtained by using a piece of dark glass (in place of the steel disk) of the proper shade to diminish the light of the planet and allow the wires to be seen through. A micrometer fitted in this way, with the glass behind the wires, answers very well indeed here and on *Saturn*. It was not used in these measures.

As to the brightness of the satellites about opposition (November 2), *Deimos* was considered to be about equal to *Enceladus*; and *Phobos* a little brighter than *Tethys*, not taking into account the glare, but estimating by imagining them isolated. The character of the light was, however, different, being sparkling and starlike, not of the quiet aspect of any of *Saturn's* satellites. This may be due to the absence of any apparent disk, or to contrast with the dull brightness of *Mars*. The colour of *Deimos* was slightly bluish, *Phobos* quite white. At the last opposition *Deimos*, the only satellite well seen, was noted as of a similar colour to *Mars* with a higher power on a smaller telescope.

On November 2 the Moon was very bright, but it had no appreciable ill effect on the visibility of the satellites; if anything, it seemed an advantage.

A weight is attached to each measure on a scale extending from 1 to 5.

All measures of position are subject to the uncertainty of estimation spoken of, but are of course independent of each other, and, with the exception of some few distances, none have been rejected.

The apparent movement of the stars near *Mars* was noted, but nothing like a third satellite was seen.

DEIMOS.

Date.	G.M.T.	Pos.	Dist.	Value.	Remarks.
1879	h m s	° '	"		
Sept. 21	15 3	240 36		1	A fine night; Satellite seen at once.
	15 5	240 0		1	
	15 19	235 45		1	
	15 37	237 0		2	
	15 41	237 35		3	
	15 43	238 25		1	
	15 45	237 31		3	
	15 48	236 43		3	
	16 17	234 45		2	

Dec. 1879.

*of the Satellites of Mars.*

97

Date.	G.M.T.	Pos.	Dist.	Value.	Remarks.
1879	h m s	° ' "	"		
Sept. 25	11 54	232 53		1	Rather misty night.
	12 0	234 4		1	
	12 2	233 1		1	
	12 5	233 55		1	
Oct. 15	11 53	249 20		1	Night very windy.
	11 58	247 30		1	
	12 2	246 58		2	
	12 3	247 33		2	
	12 5	247 10		2	
	12 7	245 35		2	
	12 20	245 32		2	
	12 22	243 14		2	
	12 27	244 40		3	
	12 36	245 30		2	
	12 55	243 50		2	
21	9 15	52 20		1	
	9 25		48.8	1	From limb.
	9 34 30	53 36		1	A star brighter than satellite about 20" beyond. A
	9 36	52 8		2	beautiful night.
	9 37	53 6		3	
	10 16 30	49 22		3	
	10 23 30	49 56		2	
	10 25	49 22		2	
	10 27		45.21	1	From limb.
	10 32	49 41		1	
	11 24	44 31		2	Satellite now faint.
	11 27 30	47 30		2	
	11 30 30	44 30		2	
	11 31 30	46 4		2	
	11 37	46 37		2	
Nov. 2	8 9	231 22		1	Windy night.
	8 11		67.54	2	Definition very fine.
	8 15	233 20		2	Distances taken from centre
	8 16	232 40	67.55	2	of disk of planet.
	8 20	232 25		2	
	8 52	229 53		2	
	8 56	229 14		2	
	8 58	228 55		3	
	8 59	229 34		4	

G

Date.	G.M.T.	Pos.	Dist.	Value.	Remarks.
1879	h m s	° '	"		
Nov. 2	9 6 30	230 15		3	
	9 8	230 4		3	
	9 10		66.09	3	
	9 18		63.89	3	
	9 19 30	230 8		3	
	10 19		61.39	3	Just visible with Mars in field.
	10 20		61.70	3	
	10 21	227 45		4	
	10 22 30	227 30		4	
5	8 44 30	62 26	56.83	2	Rather hazy.
	8 47 30	61 37	54.32	3	
	8 56	60 21	54.17	3	
	9 4	59 42	57.24	3	
	9 10	60 56		3	
11	8 43 30	210 49		3	Fine night.
	8 48	212 14		2	
	8 52 30	212 5		2	
	8 54 20		36.73	2	
	8 57		39.40	1	
15	9 31	73 2		3	Not at all easy to measure.
	9 40	72 36		3	
	9 42		39.85	1	

## PHOBOS.

Nov. 2	8 31	220 58		1	First seen.
	11 2	55 30		2	
	11 7	57 30		1	Bad seeing.
	11 20	51 1	27.16	3	
5	8 11	51 20	25.12	2	Not very clear night.
	8 15	51 58		2	
	8 19 30	48 40	25.27	2	
	8 23	49 15	26.69	2	
	8 26	50 8		1	
	8 27 30	48 4		3	
11	9 4 30	62 24		2	Fine night, but windy; satellite very bright.
	9 6	60 25		3	
	9 17 45	55 12		4	

Date.	G.M.T.	Pos.	Dist.	Value.	Remarks.
1879	h m s	°	"		
Nov. 11	9 20	55 8		3	
	9 22	56 25		2	Under I wire. }
	9 25	52 10		2	
	9 26 15	53 18		3	
	9 28	53 2		4	
	9 49	52 19			
	9 52		26.59	2	
	9 52 30		26.54	3	
	9 59 30	47 19		3	
	10 1	48 14		4	
	10 3	48 16		2	
	10 6 20	46 47		4	
13	7 44 10	51 25		2	
	7 46	49 30		2	
	7 47	50 5		2	
	7 48 30	51 27		1	
	7 51 40	50 19		3	
	10 55				Seen s.p. very faint.
15	9 8 15	235 59		5	Satellite seen with planet; very fine night.
	9 10 30		26.60	5	
	9 12	236 35		5	
	9 13 45	235 28	25.42	4	
	9 15 30	236 4		5	
	9 46	228 46		3	
	9 47 30		23.86	3	
	9 49 15	229 50		3	
	9 52	228 55		4	

November 1879.

### New Double Stars. By S. W. Burnham, Esq.

Since the preparation of my last Catalogue and measures (*Memoirs of the Royal Astronomical Society*, vol. xlv.) the work has been continued at the Dearborn Observatory whenever circumstances permitted; and I desire, in advance of the publication of another Catalogue, to call attention to some of the double stars discovered during the present year, in order to give

G 2